



Assignment

Principal Engineer / President

Education

M.S., Systems Engineering, University of California, Los Angeles, 1976

B.S., Engineering, University of California, Los Angeles, 1975

Registrations

Professional Civil Engineer, California C32331

Mark J. Wildermuth, PE Principal Engineer / President

Summary

Mr. Wildermuth has 31 years of experience in water resources engineering and planning including: surface and groundwater hydrology and hydraulics; water resources planning; surface water and groundwater computer simulation modeling; water rights; surface water and groundwater quality; flood plain management; municipal recycled water discharge impacts in receiving waters; and water supply and flood control facility design. He has also developed extensive expertise in the development of water resources management plans for groundwater basins and watersheds in southern California, and has provided expert witness and opinions for litigation support and mediation in several important issues.

His past experience has included responsible positions at major environmental consulting firms including James M. Montgomery, Consulting Engineers, Inc., where he was a principal engineer from 1987 to 1990; and Camp Dresser and McKee, Inc., 1980 to 1987. Mr. Wildermuth began his own company in 1990 to focus specifically on water resources management studies and the application of state-of-the-art

technology to water resources projects. The company has now grown to 20 professionals and became incorporated as WEI in 1998. Mr. Wildermuth received a B.S. in Engineering from the University of California at Los Angeles in 1975, and a M.S. in Water Resources Engineering from University of California at Los Angeles in 1976. He is a registered professional civil engineer in the State of California, and a member of the National Ground Water Association, American Water Resources Association, and Groundwater Resources Association of California.

Selected Project Experience

Wildermuth Environmental, Inc., Lake Forest, CA – 1990 / Current

Optimum Basin Management Program (OBMP), Chino Basin Watermaster

Mr. Wildermuth was the project manager and lead technical analyst to provide as-needed engineering services to the Chino Basin Watermaster. Activities included review of water rights applications, storage losses from over-year groundwater storage accounts, groundwater monitoring, estimating salt offset credits, estimating replenishment volumes required for proposed groundwater

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treatment project(s), coordination with San Bernardino County Flood Control District and Conservation District regarding recharge, coordination with Metropolitan Water District regarding water rates and seasonal storage service.

Mr. Wildermuth was the project manager to develop the scope of work and to implement that scope of work for the Chino Basin OBMP. The San Bernardino Court ordered the development of the OBMP. Mr. Wildermuth developed the process used to develop the OBMP scope of work and authored the engineering and institutional scopes of work. WEI, under the direction of Mr. Wildermuth, completed the engineering studies and developed the resulting management plan. The engineering scope of work included the problem definition, development of goals, developing and analyzing management components, integration of management components, financial analysis and development of an implementation strategy.

Optimum Basin Management Program Implementation, Chino Basin Watermaster

Mr. Wildermuth is the WEI project manager for WEI involvement in the OBMP Implementation. WEI efforts include running a large-scale

surface water discharge and water quality monitoring (20 stations), groundwater level and water quality (600 wells), groundwater recharge, InSAR, and extensometer monitoring programs. WEI is also providing oversight to well siting and related impact analysis for new desalter wells.

Chino Basin Dry-Year Yield Program, Chino Basin Watermaster

Mr. Wildermuth is the WEI project manager for WEI involvement in the development of the Chino Basin Dry-Year Yield (DYY) Program. WEI is role is to assist the Watermaster and Inland Empire Utilities Agency in the development of the 100,000 acre-ft DYY program. WEI completed a thorough reassessment of the hydrogeologic conditions in the Chino Basin. WEI assisted other consultants with facility planning including well siting, water quality evaluations, and specialized mapping. WEI developed and applied a sophisticated set of surface and ground water models to evaluate the DYY impacts on groundwater levels, contaminant plume movement, and surface and ground water interaction in the southern part of the basin. Currently, WEI is expanding this analysis to investigate groundwater storage programs of up to 500,000 acre-ft.

Groundwater Quality Monitoring Program, Chino Basin Watermaster

Mr. Wildermuth conducted a groundwater quality-monitoring program for the Chino Basin Watermaster involving the collection of about 70 water samples in the field and about 200 samples from cooperating agencies. This project started in 1990 and was continued through 1996. Subsequently WEI has expanded this program to about 600 wells as part of the Chino Basin OBMP

Analyses of recharge & Recharge Facilities, Chino Basin Water Conservation District

Mr. Wildermuth conducted studies to determine the annual average recharge at stormwater recharge facilities owned by the Chino Basin Water Conservation District. Daily flow simulation models were developed and applied for a period of forty one years. The results of this study are being used to improve operations and maintenance schedules at the existing facilities.

Mr. Wildermuth developed a monitoring program to determine changes in percolation rates and subsequent maintenance practices to restore maximum percolation rates. One of the key components of the monitoring program was the installation of digital water level sensors with integral data loggers to measure basin water levels every ten minutes. Wilder-



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muth Environmental developed the analytical methods and software to convert these observations into estimates of basin inflow, outlet discharge, evaporation losses, and basin recharge.

[Recharge Master Plan, Chino Basin Water Conservation District, Chino Basin Watermaster, San Bernardino County Flood Control District](#)

Mr. Wildermuth was the project manager and lead technical analyst for the recharge master plan for the Chino Basin. The objectives of the master plan were to develop a plan of recharge to meet future groundwater replenishment requirements utilizing stormwater, recycled water, and imported water; and to evaluate the change in groundwater recharge caused by the construction of flood control improvements for San Sevaine Creek and East Etiwanda Creek. This study utilized a daily runoff model to estimate the magnitude and temporal distribution of stormwater recharge.

Recycled water and imported water will be recharged in periods with minimum conflict with stormwater recharge. New facilities and modifications to existing facilities were recommended. A second phase of the recharge master plan was completed as part of the Chino Basin OBMP where WEI

collaborated with the Black and Veatch Corporation. Subsequently, the Chino Basin Watermaster, Inland Empire Utilities Agency, the Chino Basin Water Conservation District are converting 19 flood retention basin to spreading basins and are building two new recharge facilities. The total cost of the recharge improvements are approximately \$45 million.

[Nitrogen / Total Dissolved Solids \(N/TDS\) Task Force, Santa Ana Watershed Project Authority](#)

Mr. Wildermuth was the architect and co-project leader for a multi-phase comprehensive evaluation of the fate of nitrogen and TDS in the Santa Ana Watershed. In this investigation, the basin plan objectives for TDS and nitrogen were reset based on the best available data and scientific methods, and new procedures were developed to assess the availability of assimilative capacity.

Phase one involved development of procedures for evaluation of TDS and nitrogen impacts from recycling projects in the Santa Ana watershed, a massive data collection and validation effort, watershed characterization, and an initial assessment of TDS and nitrogen loads to surface water and groundwater from municipal

recycled water treatment plants and non-point sources. Phase 2A of this project involved: delineating new basin/management zone boundaries; development of groundwater storage estimates in each management unit; estimating TDS and nitrogen statistics at wells; computing volume weighted TDS and nitrate concentration for the new basin/management zones; and completing a new wasteload allocation analysis for the Santa Ana River and selected tributaries.

Phase 2B of the project involved the development and implementation of a sophisticated modeling system to evaluate the current wasteload allocation for TDS and total inorganic nitrogen for municipal recycled water plants that discharge to the Santa Ana River and its tributaries. A daily stream flow simulation model was used to estimate the TDS and TIN concentration in the Santa Ana River and its tributaries in response to recycled water discharge, stormwater runoff, non-tributary discharges, and groundwater interaction.

[San Timoteo Watershed Management Program, San Timoteo Watershed Management Authority](#)

Mr. Wildermuth was the project manager and lead technical analyst for the development of a watershed management program for the San Timoteo Watershed. This effort involved: the design of the investigation; conducting a stakeholder

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process; baseline water resource inventory and characterization; establishing the issues, needs and wants of the stakeholders; articulating the program goals, impediments to the goals and the development of "program elements" for a watershed-scale management program that will remove the impediments to the goals; and the development of an implementation plan and cost estimates.

The resulting water resources management plan contains the program to expand the water supply from its current level of about 32,000 acre-ft/yr to 99,000 acre-ft/yr. WEI is currently assisting the STWMA in implementing the second phase of the program.

[Beaumont Basin Adjudication, San Timoteo Watershed Management Authority](#)

Mr. Wildermuth provided engineering and hydrogeologic support services for the Beaumont Basin adjudication to the Cities of Banning and Beaumont, Beaumont Cherry Valley Water District, South Mesa Water Company, Yucaipa Valley Water District and other groundwater pumpers. The groundwater management concepts that were incorporated into the physical solution were developed by Mr. Wildermuth.

[Hot Creek Fish Hatchery Spring Flow, Mammoth Community Water District](#)

This work was revisited in 2003 because of concerns that increased groundwater production could impact springs in the Valentine reserve. Subsequent analysis by WEI demonstrated that there would be no impact.

[Groundwater Management Plan, Eastern Municipal Water District](#)

Mr. Wildermuth developed a groundwater management plan for the West San Jacinto basin, consistent with the long-term water resource management goals of Eastern Municipal Water District and agricultural water users. The plan was developed under California enacted groundwater management statutes (AB 3030) and was recently implemented. This plan received the Edmund G. Brown award from the State of California in 1995.

[Menifee Basin Desalter, Eastern Municipal Water District](#)

Mr. Wildermuth completed the design of a 3-mgd well field for Menifee Basin Desalter, providing groundwater management consulting to Eastern Municipal Water District.

[Groundwater Modeling for Santa Ana Watershed Project Authority](#)

Mr. Wildermuth provided hydrologic

and groundwater-modeling services used in the design of two 8-mgd well fields, and a 12-mgd well field in the Chino Basin. These well fields were intended to feed desalting facilities owned by the Santa Ana Watershed Project Authority.

Mr. Wildermuth assisted the Chino Basin Watermaster in the development of replenishment sources for the Chino desalting facilities and in the determination of salt extraction credits for agricultural interests in the basin.

[Montgomery Watson](#)

Mr. Wildermuth, as a consultant to Montgomery Watson, provided water resources consulting and modeling services in the Chino, Colton and Riverside Basins. Mr. Wildermuth directed and participated in the development of the most sophisticated groundwater model ever developed in the upper Santa Ana Basin.

[Groundwater Contamination Superfund Site, Confidential Client](#)

WEI conducted a study to determine the potential source or sources of a groundwater plume containing volatile organic compounds (VOCs), primarily trichloroethene (TCE) and tetrachloroethene (PCE). Mr. Wildermuth was responsible for the development of groundwater flow and transport models to determine the source(s) of these contaminants and the approximate



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period of loading. Surface and Groundwater Studies from Discharge of Recycled Water, City of San Bernardino

Mr. Wildermuth conducted numerous studies to evaluate receiving water impacts in surface water and groundwater from the discharge of recycled water by the City of San Bernardino to the Santa Ana River. These studies involved groundwater and surface water modeling to determine nitrogen and TDS impacts of various recycled water discharge alternatives on surface water and the groundwater basins that are recharged by these surface waters.

[Surface Water Modeling Studies, City of San Bernardino Municipal Water Department](#)

Mr. Wildermuth conducted surface water modeling studies to estimate the discharge, TDS and nitrogen impacts from various recycled water marketing alternatives proposed by the City of San Bernardino.

[Santa Margarita Company, Orange County, California](#)

Mr. Wildermuth conducted a water use audit of the Rancho Mission Viejo and has developed a phase plan of study for the development of water resources for the Ranch as the land is converted from agricultural use to urban uses.

[Preparation of application to Divert Water, Rancho Mission Viejo](#)

Mr. Wildermuth prepared an application to divert water by appropriation and supporting environmental documentation. The impact on downstream water users was evaluated and mitigation plans are being developed. Mr. Wildermuth is also involved in negotiating the sale of the diverted water to local agencies.

[Evaluation of Proposals, URS Consultants \(for Santa Ana Watershed Project Authority\)](#)

Mr. Wildermuth evaluated the impact of various waste discharge proposals for the Western Riverside Regional recycled water plant on surface and groundwater resources in the upper Santa Ana Basin.

[Saline Plume Management Alternatives, Kaiser Steel Resources](#)

Mr. Wildermuth developed saline plume management alternatives in the Chino Basin for Kaiser Steel Resources. Work involved groundwater model and water quality sampling. Solutions included pump and treat alternatives and a salt-offset alternative. Mr. Wildermuth developed the salt-offset alternative and assisted Kaiser in moving this solution through the regulatory process saving Kaiser over \$40 million.

[Conjunctive Use Plan Study, Western Municipal Water District, San Bernardino Municipal Water District, City of San Bernardino and Orange County Water District](#)

Mr. Wildermuth is conducted a study to develop conjunctive use plans to manage local and imported water and recycled water above Riverside Narrows.

[Montgomery Watson \(aka James M. Montgomery, Consulting Engineers \[JMM\]\), – 1987 to 1990](#)

Mr. Wildermuth was the manager of Water Resources studies in JMM's Irvine Office. Mr. Wildermuth was manager and lead-modeling specialist for the TDS and Nitrogen Studies, Upper Santa Ana Watershed. Responsibilities included the development of a comprehensive work plan; and modification, calibration and use of the Santa Ana Basin Planning models to evaluate future TDS and nitrogen management plans. Mr. Wildermuth developed a series of models to simulate the fate of agricultural leachates in the vadose zone and the saturated zone for the period 1900 through 2015; and a software link between the river quality model QUAL2E and the Basin Planning models. Mr. Wildermuth participated in the development and evaluation of eight management plans.

[Water Quality Management Plan, Western Municipal Water District, San Bernardino Municipal Water District, City of San Bernardino and Orange County Water District](#)

Mr. Wildermuth was the project

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manager for the development of a water quality management plan for the Colton and Riverside Groundwater Basins. Mr. Wildermuth developed a detailed work plan that was focused on moving various water management entities towards consensus on a basin management plan. The study involved the use of groundwater flow and quality models and public participation.

[Groundwater Mining Studies, Southern Nevada Water Management Study](#)

Mr. Wildermuth was the lead-modeling specialist for the evaluation of groundwater mining studies for Rail Road Valley and California Wash basins in Nevada.

[Integration of Surface /Groundwater Models, Wyoming Attorney General](#)

Mr. Wildermuth was lead-modeling specialist for the integration of surface and groundwater models for the North Platte River. The purpose of the project was to evaluate the effects of river depletions by agriculture and to evaluate reservoir management plans.

[Conjunctive Use Study, City of Santa Barbara](#)

Mr. Wildermuth was the project manager and lead-modeling specialist for a conjunctive use study

for the City of Santa Barbara. Mr. Wildermuth developed conjunctive use alternatives involving recharge of surface water from the Santa Ynez River (by injection and spreading), injection of recycled water and in-lieu recharge concepts. Mr. Wildermuth used groundwater models to evaluate the impacts of conjunctive use operations on groundwater.

[Phase IV Groundwater Investigation, Kaiser Steel Resources](#)

Mr. Wildermuth was project manager of the Phase IV Groundwater Investigation at the Kaiser Steel Facility at Fontana, California. Mr. Wildermuth's role in this study was to develop remediation plans for two large plumes of degraded groundwater emanating from Kaiser. Mr. Wildermuth directed the study team efforts that included conducting water quality sampling, drilling monitoring wells, groundwater modeling and engineering studies.

[QUAL 2E Modeling Studies, Santa Ana River Dischargers Association](#)

Mr. Wildermuth was involved in a study to review QUAL 2E modeling studies performed by the Santa Ana Regional Water Quality Control Board. Mr. Wildermuth's responsibility in this study was to provide an independent review on behalf

of the Santa Ana River Discharges Association. The key issues in this study were a determination of QUAL 2E-model reliability for establishing waste load allocation for point discharges with emphasis on nitrogen species.

[Camp Dresser & McKee, Inc., Irvine, California – 1980 to 1987](#)

[Metropolitan Water District of Southern California](#)

Mr. Wildermuth was project manager and lead-analyst for the Chino Basin Groundwater Storage Program. Mr. Wildermuth's responsibilities included the development and implementation of state-of-the-art models for non-point source contamination of groundwater and regional vadose zone modeling. The goal of the study was to estimate long-term groundwater quality impacts from large-scale conjunctive use management programs.

[TCE/DBCP investigation, Santa Ana Watershed Project Authority](#)

Mr. Wildermuth was project manager and lead-analyst for a TCE/DBCP investigation in the Redlands area. Field studies were designed and implemented to estimate the current TCE and DBCP conditions in the area. A three-dimensional model was developed to predict the fate of TCE and DBCP under various management alternatives. Alternative mitigation measures were developed and evaluated.



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Safe Yield and Groundwater Management Study, Cucamonga County Water District

Mr. Wildermuth was project manager and lead-analyst for a safe yield and groundwater management study for the Cucamonga Groundwater Basin. Mr. Wildermuth developed and calibrated a three-dimensional groundwater model to evaluate the impacts of artificial recharge, in-lieu recharge, and drought management programs. Mr. Wildermuth developed a detailed monthly hydrology for the Cucamonga Basin for use in safe yield estimates, groundwater model calibration, and water supply management.

Chino Basin Storage Program Feasibility Study, Department of Water Resources

Mr. Wildermuth was a project engineer for the Chino Basin Storage Program feasibility study. Responsibilities included the evaluation of the availability of surplus state project water for conjunctive use and an evaluation of the correlation of local flood flows and the surplus state project water.

Groundwater Modeling Study, Regional Water Quality Control Board

Mr. Wildermuth was project engineer for a groundwater modeling study for the Santa Ana Regional Board of the 400,000-acre Upper Santa Ana

Groundwater Basin. Responsibilities included a complete rewrite and calibration of the groundwater hydraulic and water quality codes. These models were then used to investigate revisions to the Upper Santa Ana Basin Plan.

Water Flow and Demand Projection Study, City of Scottsdale

Mr. Wildermuth was project engineer for a water demand and recycled water flow projection study for the City of Scottsdale. Various potential land use scenarios were analyzed to develop ultimate water demands and recycled water flows. Potential supplies include the Central Arizona Project water, groundwater, and reclaimed water.

Mr. Wildermuth developed a comprehensive and fully interactive computer model to conduct analysis. The unit factors for indoor and outdoor water demand and the parameters defining waste flow were estimated by calibrating the computer model in a selected area of Scottsdale.

Groundwater Study, Occidental Chemical

Mr. Wildermuth was project engineer for a detailed groundwater study for Occidental Chemical at a toxic spill site near Lathrop, California. The study involved the use of a two-

dimensional, multi-layer groundwater model to predict pollutant movement with and without mitigation plans.

Shallow Groundwater Management Program, The Irvine Company

Mr. Wildermuth was project manager for a study to develop a shallow groundwater management program for the Irvine subbasin for The Irvine Company. This study resulted in a recommendation to control and/or mitigate shallow groundwater in an urbanized area.

Phase II Irvine Subbasin Study, The Irvine Company

Mr. Wildermuth was project manager for the Phase II Irvine Subbasin study. Study focus was on the development and analysis of water use plans for the Irvine Subbasin.

Flood Control Study, The Irvine Company

Mr. Wildermuth was project manager and lead-analyst for a flood control study of San Diego Creek through the City of Irvine. This study analyzed flood plain development and channel improvement alternatives.

Affiliations / Organizations

American Society of Civil Engineers
 American Water Resources Association
 National Groundwater Association
 Groundwater Resources Association
 The Executive Committee